

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)EINGEGANGEN
FLÜGEL PREISSNER KASTEI

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| Applicant's or agent's file reference 0128 0024 P-PCT | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416) | |
| International application No. PCT/EP 02/09144 | International filing date (day/month/year) 14.08.2002 | Priority date (day/month/year) 14.08.2002 |
| International Patent Classification (IPC) or both national classification and IPC F16K1/22 | | |
| Applicant NORD-MICRO AG & CO. OHG et al. | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

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| Date of submission of the demand 30.01.2004 | Date of completion of this report 15.07.2004 |
| Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | Authorized Officer Hatzenbichler, C Telephone No. +49 89 2399-8912  |

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 02/09144**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-11 as originally filed

Claims, Numbers

1-12 received on 30.01.2004 with letter of 30.01.2004

Drawings, Sheets

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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International application No. PCT/EP 02/09144

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|------|
| Novelty (N) | Yes: Claims | 1-12 |
| | No: Claims | |
| Inventive step (IS) | Yes: Claims | 1-12 |
| | No: Claims | |
| Industrial applicability (IA) | Yes: Claims | 1-12 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Independent claim 1:

1. Claim 1 relates to a butterfly valve for controlling a gas pressure, in particular inside a cabin of an aircraft, comprising:
 - a valve housing having a longitudinal axis and defining a flow path for a gas along the longitudinal axis;
 - a shaft having a rotation axis; and
 - a closure member connected to the shaft;the closure member being pivotally mounted in the valve housing for rotation about the rotation axis between an open position allowing the gas to flow through the valve housing and a closed position preventing the gas from flowing through the valve housing;
the closure member consisting of a first disk and a complementary second disk which abut against each other, the first disk and the second disk being symmetrically arranged with regard to a symmetric axis extending at a predetermined angle of inclination to the rotation axis;
the first disk and the second disk comprising each an inner surface, an outer surface, and at least one contact face abutting against a corresponding contact face of the respective other disk.
2. Such a butterfly valve according to the features defined in the preamble of claim 1 is known for instance from document US-A-5 876 015 (D1).
3. The subject-matter of claim 1 is distinguished over the valve known from the closest prior art document D1 in that the contact face comprises a main portion extending parallel to the symmetric axis and at least one supplementary portion extending from an end of the main portion to the inner surface or the outer surface at a predetermined angle. Thereby, an effective positive locking between the first disk and the second disk is achieved.
4. Neither document D1 nor any of the other documents involved in the procedure gives any indication with respect to such a specific configuration of the contact face and therefore, the subject-matter of claim 1 meets the criteria of novelty and inventive step (Article 33(2)(3) PCT).

Dependent claims 2 to 12:

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5. Since the dependent claims concern particular embodiments of the butterfly valve according to claim 1, their subject-matters also meet the required criteria.

Claims

1. A butterfly valve for controlling a gas pressure, in particular inside a cabin of an aircraft, comprising:
a valve housing (10) having a longitudinal axis (11) and defining a flow path for a gas along the longitudinal axis (11);
5 a shaft (20) having a rotation axis (21); and
a closure member (30) connected to the shaft (20), the closure member (30) being pivotally mounted in the valve housing (10) for rotation about the rotation axis (21) between an open position allowing the gas to flow through the valve housing (10) and a closed position preventing the gas from flowing through the valve housing (10);
10 **characterised in** that the closure member (30) consists of a first disk (40) and a complementary second disk (50) which abut against each other, wherein the first disk (40) and the second disk (50) are symmetrically arranged with regard to a symmetric axis (31) extending at a pre-determined angle of inclination (γ) to the rotation axis (21).
15
2. The butterfly valve according to claim 1, wherein the first disk (40) and the second disk (50) comprise each an inner surface (46; 56), an outer surface (47; 57), a distal end (41; 51) having a first thickness between the inner surface (46; 56) and the outer surface (47; 57), and a proximal end (42; 52) having a second thickness between the inner surface (46; 56) and the outer surface (47; 57), the first thickness being greater than the second thickness.
20
3. The butterfly valve according to claim 2, wherein the first disk (40) and the second disk (50) comprise each at least one contact face (43, 44, 45; 53, 54, 55) abutting against a corresponding contact face (53, 54, 55; 43, 44, 45) of the respective other disk (40; 50).
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ART 34 AMDT.

4. The butterfly valve according to claim 3, wherein the contact face (43, 44, 45; 53; 54, 55) extends from the proximal end (42; 52) towards the distal end (41; 51) covering between about 10 % and about 90 %, preferably about 50 %, of the inner surface (46; 56) along a vertical axis (12) extending orthogonal to the longitudinal axis (11) of the valve housing (10).
5. The butterfly valve according to claim 3 or 4, wherein the contact face comprises a main portion (44; 54) extending parallel to the symmetric axis (31) and a first supplementary portion (43; 53) extending from an upper end of the main portion (44; 54) to the inner surface (46; 56) at a first angle (α).
6. The butterfly valve according to claim 5, wherein the contact face comprises a second supplementary portion (45; 55) extending from a lower end of the main portion (44; 54) to the outer surface (47; 57) at a second angle (β).
7. The butterfly valve according to claim 5 or 6, wherein the first angle (α) between the main portion (44; 54) and the first supplementary portion (43; 53) is less than about 90°.
8. The butterfly valve according to claim 6 or 7, wherein the second angle (β) between the main portion (44; 54) and the second supplementary portion (45; 55) is less than about 90°.
9. The butterfly valve according to any of the claims 5 to 8, wherein the main portion (44; 54) extends along the vertical axis (12).

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ART 34 AMDT

10. The butterfly valve according to any of the claims 1 to 9, wherein the first disk (40) and the second disk (50) comprise each an opening (48; 58), the openings (48; 58) being in alignment and accommodating the shaft (20).
- 5 11. The butterfly valve according to claim 10, wherein the opening (48; 58) extends at the angle of inclination (γ) to the main portion (44; 54) of the contact face.
- 10 12. The butterfly valve according to claim 10 or 11, wherein the shaft (20) is secured in the openings (48; 58) by positive locking.
13. The butterfly valve according to claim 12, wherein the shaft is configured as splined shaft (20).
- 15 14. The butterfly valve according to any of the claims 1 to 13, wherein the angle of inclination (γ) is less than about 15°, preferably between about 5° and about 10°.

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